



Smart Columbus Overview



SmartCols-14

1. Smart Columbus Vision

- To be the nation's epicenter for intelligent transportation systems (ITS) research, development, and implementation.
- Leverage ITS to create opportunities for economic development and job creation.
- Provide ladders of opportunity to our residents to better access jobs, fresh food, services, education, and recreation.
- Show the nation and the world a practical path to implementing ITS, making transportation accessible to all, and reducing greenhouse gas emissions.
- Use ITS to address major community challenges such as infant mortality.



2. Five Goals

- 1) **ACCESS TO JOBS.** Columbus has several major employment centers; however, some workers do not have reasonable access to these jobs. Through ITS we will improve access to jobs through expanded mobility options in major job centers in the City.
- 2) **SMART LOGISTICS.** We will build on our strength as a global logistics hub by optimizing the movement and delivery of freight through real time traffic, weather, and routing data for trucks.
- 3) **CONNECTED VISITORS.** Visitors to the Columbus Region provide an overall economic impact of \$8.7 billion and support over 71,000 jobs. Consistent feedback we receive from visitors is about transit and parking. We are working with Experience Columbus to provide real-time event, transit, traffic, and parking information to visitors and residents.
- 4) **CONNECTED CITIZENS.** Columbus has select neighborhoods like Linden with mobility challenges that limit citizen access to jobs, health care, and education services. We will connect Columbus residents to safe, reliable transportation that can be accessed by all.
- 5) **SUSTAINABLE TRANSPORTATION.** Transportation is responsible for 28 percent of U.S. carbon emissions. We will invest in vehicles, infrastructure, programs, and incentives to support energy efficiency, transportation electrification, and greenhouse gas reduction that is environmentally and financially sustainable.

3. Four Core Enabling Technologies

1) Columbus Connected Transportation Network

- We will deploy dedicated short range communications (DSRC) technology along 50 miles of roadway, at 175 traffic signals, and on 3,000 vehicles.
 - This will be one of the largest demonstrations of connected vehicles in the nation.
 - This technology will allow enhanced emergency vehicle preemption passage through intersections, transit vehicle priority to improve transit operations, real-time changes for signal timing, improved pedestrian and vehicle detection, and alert pedestrians to transit vehicle arrivals.
 - It will even provide drivers with recommendations on how to operate their vehicles in the most eco-friendly manner.
- We will equip the entire COTA bus fleet with MobileEye Shield+ technology that will provide visual collision avoidance technology and roadway condition data to our Public Service Department.
- Deploy autonomous vehicles (AVs) through 3 routes in the Easton Commercial District.
- Implement driver assisted truck platooning that would increase productivity, efficiency, and save fuel .
- Provide loading zone availability, better low bridge warnings, and regional truck parking and information and management system.
- Deploy active parking management using radio frequency identification (RFID) technology to help better manage permit parking issuance and parking.

2) Integrated Data Exchange (IDE)

- The IDE is a dynamic platform that integrates data from deployed smart technologies and community partners offering an open-source information portal intended to facilitate better decision-making and problem solving for all users.
- The IDE will be used to generate metrics on Smart Columbus project success and how we providing greater ladders of opportunity to our residents



- We will create a Smart Columbus Developer Network that will leverage the data generated through Smart Columbus to encourage third-party developer participation to create innovative applications and services

3) Enhanced Human Services

- **Multi-Modal Trip Planning Application**

- Provides turn-by-turn voice guidance for driving with real-time traffic; incidents and road closures; routing and guidance for transit, pedestrian, and ride-share; and works in an offline mode to enable underserved communities access to travel guidance without a cellular data plan.
- Users can compare travel options across modes and plan their travel based upon current traffic conditions and availability of services.
- We will also provide real-time event, transit, traffic, and parking information to visitors and residents.
- We will add multi-lingual information on parking availability, ridesharing options, and car/bicycle sharing options, and that will allow for the coordination of travel across these modes (i.e., availability of services across the entire trip).

- **Smart Pass**

- We will create a dual chip card and smart phone payment system that will allow all residents to pay for all the transportation options in the city like the bus, taxi, ridesharing services (Uber, Lyft), Carshare (car2go), and bikeshare (CoGo).
- This will address residents who are cash based or credit challenged as well as residents make it easier for all residents to pay for these same services.

- **Transit Benefit Program**

- Work with downtown employers to encourage mode shift among employees.

- **Health Services and Infant Mortality**

- The City will partner with Sidewalk Labs to utilize their Flow platform to allow private service providers, such as doctor's offices, to assist their patients in planning and paying for travel to their office as well as providing automated notification if publically assisted transportation trips are missed or not taken so that follow-up with those patients can be made.
- This will be a critical component and feature that will be used to reduce infant mortality, which is four times the national average in our challenged residential neighborhoods, particularly as a result of lack of access to consistent prenatal care and challenging economic and social conditions.
- According to Franklin County Job & Family Services, as of January 4, 2016 there are 2,759 women of child bearing age on Medicaid in 43211 (Linden).
- 1st and last mile connectivity is very important to citizens like pregnant mothers who have difficulty walking sometimes long distances to get to transit or doctor's offices
- The locations of the majority of OB/GYN doctors that accept Medicaid are outside of Linden area and not along the CMAX COTA line.

- **Inclusive Mobility**

- Smart Columbus will pilot the deployment of a new mobile device application from Mass Factory in Barcelona, Spain that enables those with reduced mobility including the elderly, cognitively impaired, and even visually impaired.



- Their flagship mobile application 'App&Town' (Figure A-5) is a free Android mobile application that allows users to plan and navigate their transit routes.
- This application will be deployed initially as a pilot installation to ensure that the concepts are compatible with US systems and processes.
- Following a successful pilot deployment, the intention is to launch a full deployment across all public transit services in the City including those operated by COTA, The Ohio State University (OSU), and others to be determined.
- **Multi-Function Kiosks**
 - The City will deploy kiosks that have the ability to provide transit and transportation information, Wi-Fi, internet access, access to social services, and add money to Smart Pass
- **Neighborhood Hubs**
 - Smart Neighborhood Hubs would help address first and last mile challenges by supporting a range of transportation options
 - Each hub would have kiosks and access to bikeshare and carshare services
 - Car owners can park at the transit centers to better access the CMAX
 - We would also include EV charging stations at each Hub.
 - The City of Columbus will employ smart Neighborhood Hubs in the City along the COTA CMAX BRT along Cleveland Avenue Corridor in the Linden Neighborhood
 - Hubs in Linden will be located at the Northern Lights Shopping Center and the Linden Transit Center.
 - Additional Hubs will be located outside the neighborhood to provide access to Easton Town Center, Columbus State Community College (CSCC), and Downtown Columbus.

4) Electric Vehicle Infrastructure

- **Electricity Supply Decarbonization**
 - Group renewable power purchases plans for business and residents
 - Work with AEP to expand Smart Grid project to the rest of Columbus
- **Fleet Electrification**
 - City of Columbus will begin the electrification of its fleet and lead the way for other government, private, and carsharing fleets to begin their electrification
 - Example-Columbus Partnership will work with its CEOs to each purchase an EV and add charging stations at their businesses
- **Work with Transit, Autonomous and Multi-Modal Systems in the City to boost ridership, lower carbon intensity, and implement electrified autonomous vehicles**
- **Drive Consumer EV Adoption through expanded public outreach, incentives, and group purchases**
- **Increase the number of existing of public and private charging stations by 400%**

4. Deployment Districts

1) Residential District (Linden)

- **Linden and Cleveland Avenue CMAX Bus Rapid Transit**
 - Linden is one of the city's most challenged communities with high unemployment, poverty, and infant mortality



- Main focus of our deployment is the creation of a Smart Corridor along the new COTA CMAX BRT project from Polaris to downtown
- The CMAX will provide improved pedestrian access (new sidewalks) and safety (addition of Smart Intersections and improved lighting), travel time savings of 20% (ease of travel), and real time bus arrival times on screens at BRT stops (will address people who do not have smart phones).
- The CMAX connects two of the largest job centers in Columbus (Downtown and Polaris), 2 major hospitals (St. Ann's Hospital and OhioHealth Westerville Campus), Columbus State Community College, and in between 2 our most challenged neighborhoods—Linden and Milo Grogan.
- Two additional park and rides and 1 additional transit center will provide greater access to other bus routes in the City.
- COTA will launch CMAX initially as a free service in Linden to incentivize new transit riders who live in the neighborhood and encourage the use of park-and-ride lots along the corridor.
- This is where you will see a lot of the CCTN technology be implemented like DSRC, Kiosks, Neighborhood Hubs, etc.
- **Motion-responsive LED Smart Street Lighting with embedded Wi-Fi infrastructure will be installed on Hudson Street to improve safety, reduce electricity usage, and increase the access of residents to free Wi-Fi**
 - This free service will help enable online educational and career development resources for neighborhood residents, thereby providing an additional ladder of opportunity.
 - Neighborhood residents report slow Internet speeds in Linden, as the underlying coaxial infrastructure is outdated and Internet service providers have demonstrated little interest in making upgrades.

2) Commercial District (Easton)

- Easton is one of the city's largest job centers and a diversity of jobs with retail, corporate, and warehouse jobs and with wages from high to low
- Easton's huge size (1,300 acres) also makes it the perfect place to deploy AVs to address 1st and last mile challenges
- The Easton Transit Center is the focus of AV deployment
- Instead of waiting for another bus to take residents to a stop closer to work, people could take a 12-16 passenger AV Shuttle that would drop them off right in front of their place of business
- 3 Routes – one to L Brands facility, one to retail center at the Easton Town Center, and one to the corporate facilities at the Southern end of Easton
- 6 total AVs for initial deployment

3) Downtown District (Urban Core)

- Downtown is thriving--it is the region's largest job center with 83,000 jobs a, has a housing occupancy rate of 96%, and office vacancy rate of 12%
- The greatest challenge to continued growth and development is the lack of parking availability



- Here is where our multi-modal trip planning application, loading zone management, active permit parking, and transit benefit program will be deployed

4) Logistics District (Rickenbacker)

- The Rickenbacker Inland Port is a high-speed international, multimodal logistics hub, has one of the world's only cargo-dedicated airports, and boasts the 7th most active foreign trade zone in the U.S.
- The Columbus Region ranks No. 1 among inland and coastal ports in population concentration within a one-day drive and Columbus is within a 10 hour drive of 47% of the U.S. population.
- Here is where will implement driver assisted truck platooning along the Alum Creek Corridor that will decrease congestion and increase productivity, efficiency, and save fuel
- Our suite of freight applications will provide loading zone availability, better low bridge warnings, and a regional real-time truck parking and information and management system.

5. Outcomes

1) IMPROVE SAFETY

- 90% of accidents are caused by human error by incorporating technology like dedicated short range communications (DSRC), AVs, and Mobileye Shield+, we hope to dramatically reduce this percentage.
- DSRC will be deployed along 50 miles of roadway, on 175 traffic signals, and on 3,000 vehicles.
- DSRC will allow enhanced emergency vehicle preemption passage through intersections, transit vehicle priority to improve transit operations, real-time changes for signal timing, improved pedestrian and vehicle detection, and alert pedestrians to transit vehicle arrivals.
- Equip the entire COTA bus fleet with MobileEye Shield+ technology that will provide visual collision avoidance technology and provide roadway condition data to our Public Service Department.
- Deploy active parking management using radio frequency identification (RFID) technology to help better manage permit parking issuance and parking.

2) ENHANCE MOBILITY

- All citizens will be able to access all the different modes of transportation in our city with our Smart Pass.
- Neighborhood Hubs will make it easier for residents to access different modes of transportation in our City with additional car and bike sharing options, easier access to BRT, and EV charging options.

3) ENHANCE LADDERS OF OPPORTUNITY

- With greater mobility options and better addressing first and last mile challenges, we will provide residents better access jobs, fresh food, services, education, and recreation.
- These ladders of opportunity will also help to address the social and economic challenges that are at the core of many city challenges like infant mortality.

4) ADDRESS CLIMATE CHANGE

- Increasing EV deployment, adoption, and charging stations will dramatically increase the number of the number of EVs in our City by 400% in 4 years.
- The smart grid expansion and renewable power purchase programs will further decarbonize our electrical system
- Smart Columbus projects like truck platooning, loading zone management, all provide greater efficiency that reduces greenhouse gas emissions.